EXPLORING LIONS AND THEIR PREY IN KENYA

2014 FIELD REPORT
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Background Information

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CHANGES TO:
PROJECT SCIENTISTS: N/A
RESEARCH SITE: N/A
RESEARCH SITE LATITUDE / LONGITUDE: N/A
PROTECTED AREA STATUS: This site was green listed on the IUCN Green List of Protected Areas and now one of the only two wildlife conservancies in Africa to be awarded the honor
(http://olpejetaconservancy.cmail1.com/t/r-e-ctluldk-tkljbtddh-r/.)
Dear Earthwatch 2014 Volunteer,

Jambo Sana from Ol Pejeta!

It has been a while since your visit and I would like to take this special opportunity to update you on our progress and to thank you sincerely for your support.

This past year, when I set out to organize our very first Earthwatch expedition, I did not know what to expect. However, I’m pleased that it all turned out so well! We were privileged to welcome groups of intelligent, supportive and highly talented volunteers.

Thanks to you and Earthwatch expeditions, we managed to achieve many of our scientific objectives. Nevertheless, the challenges of conserving the blondes (African Lions) and reversing the decline in hartebeest numbers remain enormous and we shall appreciate your continued support. I urge you to spread the word on the plight of African wildlife. In this vein, we encourage you to consider volunteering again and recommending our expedition to your networks.

Our experience was not without its struggles; among other things, identifying grass species turned out to be an uphill task, but we are now experts thanks to your dedication. As a result, our field methods have now significantly improved and refined! Rest assured we will incorporate all your feedback in order to make future expeditions even more memorable. Your enthusiasm was highly rewarding and it was a great joy to work with you.

The magnificent snow-capped Mount Kenya, scenic landscapes, and an astounding variety of animals living in harmony with livestock are just a few of the memories we hope you carried with you and shall return to see.

Thank you and Karibu Tena,

Caroline C. Ng’weno
Co-Principal Investigator Exploring Lions and Their Prey in Kenya Expedition
SECTION ONE: Scientific research achievements

TOP HIGHLIGHT FROM THE PAST SEASON
Our greatest and most exciting achievement of the 2014 field season has been successfully collaring 3 lionesses thus bringing our number of prides with collared lionesses up to 5. As a result, data downloaded from the GPS collars has formed the basis of our 2014 ecological monitoring activities and Earthwatch expeditions. This has enabled us to quantify the relative impacts of predation on hartebeest recruitment and survival in Ol Pejeta Conservancy, Laikipia. We shall continue to undertake intensive studies in the coming years in order to achieve scientifically sound results.

REPORTING AGAINST RESEARCH OBJECTIVES

Plate 1. A herd of zebra grazing close to hartebeest and hence making them more vulnerable to predation (apparent competition).

Objective 1: Working to Conserve a Critically Endangered Antelope
Quantifying the relative role of factors potentially limiting ungulate recruitment is critical for understanding demography and ensuring effective management strategies. Although there is little support in published literature, the role of predation on several species of wild ungulates (most notably hartebeest) has received considerable attention (e.g., Georgiadis et al., 2007). However, few studies have simultaneously addressed the roles of limiting factors on hartebeest, therefore since January 2012, we have been intensively monitoring hartebeest demography with a focus on herds under two different predator scenarios in OPC; (i.) Lions present, (ii.) Lion absent. We then compared hartebeest demography in these two settings to assess the relative role that predation is driving the continued decline of the hartebeest in Laikipia.

KEY FINDINGS: Our data demonstrate that hartebeest on OPC have been declining over the years, as they have elsewhere in Laikipia (Ng’weno et al., Manuscript in prep) This observation we found to be as a result of predation by lions. Therefore, our findings form a basis for informed management and conservation decisions towards conservation of this charismatic species in its native range in Northern Kenya. However, to institute proper conservation measures, we are still monitoring jackson’s hartebeest demographics in order to get scientifically sound data that would aid in determining the cause of low recruitment of these subpopulations.
Figure 4: A: Lioness being collared. B: Tracking one of the collared prides. C: Verifying kill site from GPS clusters (intensive kill search within 50m radius and also record number of tree).

Plate 2: A lion feeding on a zebra, the GPS cluster identification technique seems to be achieving greater results.
Objective 2: Spatial Distributions of Primary Prey and Catchability: Where Do Predators Hunt?

Using Global Positioning System telemetry-collars, we have investigated 136 GPS location clusters to identify kill and estimate the number and species of prey killed. We defined a cluster spatially as ≥2 locations within 100 m of each other within a 24-hour period. Of the 136 clusters, 46 were lion, 34 wild dog, 23 cheetahs, and 33 unknown. Identification of prey items is ongoing through scat analysis.

KEY FINDINGS: Field work carried out on to date has provided preliminary information to what extent lions prey on zebra (primary prey), hartebeest (secondary prey), or other prey species in OPC. Our data and findings will aid in understanding dynamics of lions and their prey, and how individuals use and select habitat, disperse, and move among populations in OPC. Therefore, the results from this research will aid wildlife managers in making decisions regarding the management of lions and their prey. However, it is too early to provide any conclusive results as we are yet to test whether hartebeest incur increasing rates of predation as a function of proximity to zebra aggregations or landscape features (see notes below on way forward). However, preliminary results suggest that lion prides home ranges overlap with grazing lawns. Based on preliminary analysis, plains zebra were the most preferred prey compared with other prey species.

Preferred habitat for hunting was acacia followed by the plains. No kills in Euclea or riverine habitat, possibly due to visibility bias. We also assessed the density and distribution of other large carnivore across the study area based on camera trap data. The distribution and abundance of six large carnivores will be modeled with habitat variables including prey (prey abundance and density from distance sampling), physical variables (e.g. habitat type, elevation) and interactions with small carnivores (jackals). Thus, field data collection and compilation from camera traps is still being processed. We will continue to monitor carnivores twice weekly via aerial telemetry throughout the year for predation sites investigation.

SECTION TWO: Impacts

PARTNERSHIPS

Ol Pejeta conservancy: Our field base and we also worked with OPC Wildlife Dept. by providing data and results to inform sound management decisions. The Dept. also supported our work by providing an additional field vehicle and provision of field rangers for escorting the volunteers. While OPC PR and marketing Dept. also posted highlights on our project on OPC website.

Laikipia Wildlife Forum: a non-government organization dedicated to providing solutions for wildlife-livestock compatibility continue to be supportive in disseminating our results.

University of Wyoming: Students from University of Wyoming and Kenya participate in field research in OPC.

Daraja Girls’ Empowerment Project: The dearth of African women in conservation in local Kenyan universities and work place create a lack of female role models in visible, high-level positions. Thus, through partnership with Daraja academy we continue to facilitate careers for Kenyan women in science by attaching the students in our project.

Karatina University: In contrast to the immense natural wealth in the tropics, financial resources and adequately trained personnel for conservation science are critically lacking. Young African researchers are therefore facing an uphill struggle to establish their careers in science due to the relatively little research being carried out because of lack of infrastructure and logistical difficulties. We therefore partner with Karatina University in Kenya to mentor students undertaking wildlife conservation degrees by pairing them with scientists working within our project.

CONTRIBUTIONS TO CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

- National or regional
  Our data was specifically requested this year by the Kenya Wildlife Service to help inform the Carnivore strategy Plan. Our Co-PI Dr. Martin Mulama is a member of this group.

- Local
  Data collected has been used by OPC management to create a better understanding of carnivore distribution and abundance. We also, developed monitoring protocols to standardize monitoring activities.
DEVELOPING ENVIRONMENTAL LEADERS

Our project seeks to build capacity and train the next generation of young Kenyan conservationists at both the graduate and under-graduate levels. First, our project has provided valuable support and training to approx. 10 undergraduate research assistants and hired three technicians (Nelly, Patrick and Luke), to assist with field activities such as analysis of camera trap data among other field activities. Second, in collaboration with local universities we have been focusing on linking wildlife conservation theory learnt in school with field practice. For example, students are exposed to a suite of wildlife monitoring field techniques and methods tailored towards assessing wildlife ecology, management policies and practices with specific application to OPC. Such activities include, lion tracking, camera trapping surveys, vegetation assessments, they are also involved in field research, data analysis which consequently improves their field reporting skills.

The main highlights for the season were:

1. Our Kenyan PhD student Caroline Ng’weno was awarded the EFN aspiring Faculty Fellowship and Faculty for the Future award in 2014. She also attended the Earthwatch summit in Boston.
2. Nelly Jepkirui, our Project Assistant was nominated to join the Earthwatch Emerging Scientists Programme from 2nd - 13th December 2014 at the Lajuma Research Centre, Soutpansberg Mountains, Limpopo Province, South Africa.
3. Joshua Wambugu a Conservation Education officer at OPC was awarded the Earthwatch Shulman Award that support active and emerging leaders to develop their capacity as scientists and teachers. Joshua has been actively involved in preparing teachers on better ways of delivering conservation messages. This has been achieved through teachers orientation workshops and student visitations to the conservancy. During which the teachers and students had an opportunity to understand the predator movements and distribution as they are the key source of human wildlife conflict and other additional issues our project addresses.

ACTIONS OR ACTIVITIES THAT ENHANCE NATURAL AND/OR SOCIAL CAPITAL

Hiring of locals (particularly women) as field assistants: During the previous season we engaged five women (Nelly, Ella, Jane, Lilian and Mercy May) to gain leadership experience which is an area we felt was lacking.

Livestock husbandry practice: We accompanied the department during their field day and had an opportunity to interact with the locals and a chance to inform the community on the importance of proper stocking levels and ways of preventing conflicts with carnivores. We also emphasized the importance of using cattle as an ecological tool.

CONSERVATION OF TAXA

1) Alcephalus busephalus jacksonii - Kongoni
2) IUCN Red List status - Vulnerable however, it is an endangered species in Laikipia and of cultural importance
3) Predation is considered to be one of the several threats to viability of this population, which has led locals to consider re-implementing lethal control. However, lions themselves (ranked as “vulnerable” on the IUCN red list) have undergone rapid range collapse and now persist largely within protected areas. Our research offers a potential solution through which hartebeest numbers can be bolstered without lethal control of lions and other predators.

CONSERVATION OF HABITATS

Habitat heterogeneity likely underlies the staggering diversity of large mammalian herbivores that typify African savannas. This heterogeneity arises from a dynamic interplay between rainfall, fire, and herbivory. In particular, the grazing lawns created by zebra, buffalo, wildebeests and other bulk grazers are mimicked by traditional livestock-rearing practices, which enhance and maintain landscape heterogeneity. Old corral sites (or “glades”) attract aggregations of zebra and impala, which create and maintain grazing lawns through nutrient deposition and mowing.

IMPACTING LOCAL LIVELIHOODS

Employment - We hire individuals from the local community as part of our field staff. This helps strengthen our relationship and also improves their livelihoods.

Women’s Project Support - Based on our goal of linking local communities with facilitation of OPC community Dept. Earthwatch volunteers visited schools and local communities within OPC. During the visit, the Samburu women showcased their beaded items and sold them to volunteers. Key in this is the direct economic benefit of jewelry purchased from community women groups during each visit and thus providing the much needed income. In a bid to scale up the potential for increased income one volunteer offered to produce postcards of photographs of displayed jewellery. Ol Pejeta Conservancy will facilitate sale of these postcards with 100% return to the women groups. Without consideration to the potential for growth inherent in the project, the visit to the community groups Earthwatch volunteers significantly nurtured the relationship between our Earthwatch Expedition, OPC and the local community to the North of our field base.
**Sponsorship** - Following the school visits, Jill Doescher’s generosity to sponsor secondary education for two girls deepens the relationship and provides a platform for sharing understanding with the local communities on the importance of wildlife conservation as the benefitting families, and community at large relate this benefit to conservation efforts advanced through our Expedition and OPC.

**Training** - To expose what our research is all about, we hosted and trained local patrol rangers at Ol Pejeta Conservancy where our project is based. We presented a short talk and trained the conservancy patrol in the use of Global Positioning Systems, for example, some basic GPS handling was covered - marking and naming a point, performing a goto and the basic concept behind GPS. Some theoretical background of large carnivores in combination with tracking skills to record large carnivore numbers and distribution was also discussed and exercised. It was great to see the trainees being enthusiastic and their prior knowledge of some wildlife that they were already familiar with encouraged debate.

**LOCAL COMMUNITY ACTIVITIES**

It is our goal to be able to provide opportunities for communities to participate in each of our programs. However, because of high costs, most are deprived the chance, thus outside grants are an important factor in being able to reach that goal. We are extremely grateful to the Pam Cheson Family Foundation for their investment in our project and in the last season we received funding to support two community fellows. By the participation of community fellows in our project, local people have started to understand our research and conservation methods. The fellows act as our ambassadors and have referred to us a number of policy makers seeking information on conservation. Our results are also shared with local leaders to advice on policy based on results.

Additionally, opportunities exist to seek feedback at two levels. Before undertaking field activities, communities get to discuss on-going work through a presentation from the Earthwatch project staff. They are allowed to ask questions concerning our project and ensuing discussions elicit important feedback messages to the project as well as enrich understanding of how best we can help communities in alignment to our research goals. The involvement in field excursions which follow allow observation, hands-on and debate among local community members, volunteers and project staff. Constant interaction and communication, between community members and staff at the conservancy, beyond the volunteer visits, provide feedback of great importance to the project and OPC. Often communication between community leaders and the project leader through email continues and offers opportunity for further feedback given our strengthened relationship.

**DISSEMINATION OF RESEARCH RESULTS**

**Scientific peer-reviewed publications**

We continue to disseminate the results of our work in a variety of ways, including publications, formal and informal presentations, outreach efforts, and the media. We are in the process of compiling a manuscript:

**Grey literature and other dissemination**

We also gave several formal presentations about our work in 2014:

**I. Local community meeting:**

We held a community outreach day for pastoral communities around OPC on October 2014. During this event, our team and students showcased their current projects and explained in depth their equipment used in research such as various tracking equipment, measuring rods, camera traps and others. Local people were very interested to learn about all activities and we decided to organize the community outreach day annually.

**II. Summary Reports:**

We presented field observation summaries and figures based on hartebeest counts on OPC notice board distributed on various locations i.e gates, research centre and staff noticeboards. Our results on lion movement were also shared with our community liaison officer so that he could inform the surrounding communities on lion hot spots.
SECTION THREE: Anything else

PROJECT FUNDING
Pam Chesonis provided both project underwriting and support for community fellows for the project.

September 24, 2014 — The World Wildlife Fund (WWF) awarded Russell E. Train Fellowship to Co-PI -- Caroline Ng’weno, for her commitment to the environment and to empower her to become a community conservation champion. The interactions and affiliation to Earthwatch proved her as a strong leader and was of particular interest.

IS THERE ANYTHING ELSE YOU WOULD LIKE TO TELL US?
We would like to thank Earthwatch for all their continued support.

ACKNOWLEDGEMENTS
Our research was made possible by funding of Earthwatch and support of: Kenya Wildlife Service, Ol Pejeta Conservancy who continue to provide logistic support, University of Wyoming’s Berry Biodiversity Conservation Center, University of Wyoming’s Haub School of Environment and CREOI for additional financial support. Personnel included Earthwatch volunteer teams 2 - 4 in 2014, Nelly Maiyo, Douglas Kamaru, Ella Seling, Luke Kingetich, Philip Songok, Paul Gacheru and Chris Waigwa. All of whom contributed to the preparation of this report or the collection of the data contained within it. We would also like to thank Kyle and Amanda for their project administration, as well Stan for their continued coordination, patience and advice while we almost gave up on the project they continually inspired us to keep pushing.

Lastly, we acknowledge the dedication and hard work of the Earthwatch volunteers and our field crew who helped run the teams and made our field seasons possible.